

**REMARKS**

1. In the above-captioned Office Action, the Examiner rejected claims 4 and 6 under 35 U.S.C. §112, second paragraph. Claims 1-27 were rejected under 35 U.S.C. §103(a) given Ma (U.S. Patent No. 5,727,384) in view of Izawa et al. (U.S. Patent No. 6,005,761) or Ohsaka et al. (U.S. Patent No. 6,205,010). These rejections are traversed and reconsideration is hereby respectfully requested.

2. The Examiner rejected claims 4 and 6 under 35 U.S.C. §112, second paragraph because the phrase "the electronic component" is vague. Claims 4 and 6 as amended above are in compliance with 35 U.S.C. §112, second paragraph.

3. Claims 1-27 were rejected under 35 U.S.C. §103(a) given Ma in view of Izawa or Ohsaka.

Ma teaches a management system for an engine having a rapid heating system for a hot operating system. The management system measures the time since the engine was last switched off and estimates temperature of the hot operating system based on that time. The management system controls the rapid heating system in dependence on the estimated temperature of the *hot operating system*. See Column 2, lines 13-25.

Ma does not teach or suggest determining a temperature for a first *electronic* component and when the temperature for the first *electronic* component exceeds a temperature condition, reducing pre-cycle warm-up for a *second* electronic component, as set forth in independent claim 1. Ma does not teach or suggest when the temperature for a first electronic component falls between a temperature condition when a second electronic component is warm and a temperature condition below which the second electronic component is damaged, reducing pre-cycle warm-up for the second electronic component, as set forth in independent claim 13. Ma does not teach or suggest utilizing a temperature of a driver capable of driving an electronic component to determine whether or not to reduce pre-cycle warm-up for the electronic component, as set forth in independent claim 15.

Prior to discussing the merits of the Examiner's position, the applicant believes it would be helpful to first briefly describe and characterize the Izawa reference.

## THE IZAWA REFERENCE

As stated in Izawa:

... its primary objective is to provide an overheat protection device, which monitors the energized state of the drive circuit that drives the load; resets the energized state when it detects the overheat state of the drive circuit during the energized state ... [Column 2, lines 56-60].

Because the immediate resetting of the power limit control state can be executed, it is possible to prevent excess thermal stresses in the drive circuit that would otherwise be caused by the power limit control. That is, since excess thermal stresses can be avoided, the reliability of the drive circuit can be enhanced. [Column 13, lines 14-19].

Izawa therefore describes a method of detecting an overheat state for a driver, and preventing that same device from overheating by resetting its energized state, i.e., turning off the driver. Thus, Izawa teaches measurement of the temperature of a driver, a first electronic component, to prevent overheating of the driver, not to reduce pre-cycle warm-up for a second electronic component. Izawa does not teach or suggest that his load has a pre-cycle warm-up nor how or why to reduce pre-cycle warm-up for such components, as set forth in the claims of the present application. Izawa, therefore, is trying to solve a different problem than unneeded pre-cycle warm-up, and further Izawa is trying to protect a *different* device, the driver, rather than a device undergoing pre-cycle warm-up. The present application provides the ability to reduce pre-cycle warm-up, e.g., facilitating a quicker engine start, reducing wear and tear on the device, and so forth. Izawa instead teaches a method of preventing only catastrophic part failure due to overheating. If Izawa and Ma could be combined, the pre-cycle warm-up would only be eliminated prior to a catastrophic failure of the *driver*, not the second electronic component, e.g., the glow plug, and no other benefits, as provided by the present invention, would be realized. A combination of Ma and Izawa would result in the catastrophic failure of the second electronic component when the driver is more robust than the second electronic component.

Thus, one of skill in the art would not look to Izawa to reduce pre-cycle warm-up for a second electronic component, nor to prevent the second component from unneeded pre-cycle warm-up, as set forth in the claims.

Prior to discussing the merits of the Examiner's position, the applicant believes it would be helpful to first briefly describe and characterize the Ohsaka reference.

## THE OHSAKA REFERENCE

As stated in Ohsaka:

More particularly the invention relates to a switch circuit having a protection function, which is suited to control turning a lamp or motor of a car ON or OFF [Column 1, lines 11-13].

A conventional switch circuit with a protection function, having a system for detecting an over-current supplied to a load and automatically interrupting it is generally known [Column 1, lines 14-16].

However, if a lamp using a tungsten or other filament as a load is used, when the switch circuit is turned on so as to light the lamp, a sharp surge of starting current flows. The reason is that before the lamp lights, the resistance of the filament (at a comparatively low temperature) is low; therefore, when the lamp lights, current rises sharply, and decreases thereafter, due to an increase in the resistance. Thus, in the conventional switch system with over-current protection, the protection function is triggered by the starting current, and a normal lighting operation cannot be performed. Even if a motor is used as a load, when power is supplied to the motor, a large current surge occurs, so that the protection function of the switch circuit is activated and a normal motor driving operation cannot be performed. [Column 1, lines 24-37].

In another system, the temperature of an electric power element (switch circuit) is detected, and when the power element is overheated more than the predetermined temperature, the protection function is performed. ... In these switch circuits, even in the case of a current surge when the lamp lights or the motor starts, no unnecessary protection function is performed, because the time response for temperature rise is slow; thus, a normal lamp lighting operation or a motor starting operation can be performed. [Column 1, lines 38-52].

However, in a conventional overcurrent protected switch circuit which uses a temperature detection system, even if overheating is detected when an error occurs, and the switch circuit is therefore properly interrupted, there is a problem that an ON-OFF cycle occurs, in which the protection function is recovered due to a reduction in the temperature, and thereafter the temperature rises again, so that the cycle is repeated [Column 1, lines 53-60].

Ohsaka teaches on overheat protection device based on heavy current detection. Certain loads have a large in-rush current, such as a lamp or a motor, and trigger the overcurrent protection device simply by being turned on, thereby turning off the load almost immediately after it is turned on, resulting in the inability to turn on such a load. To overcome this problem, Ohsaka teaches placing temperature detecting means in the neighborhood of an electronic power element for the load to

provide an interrupt signal that prevents overheating, but does not turn-off the load when it turns on. Ohsaka is also directed to preventing an undesirable ON-OFF cycle that results from temperature detection systems that turn a device on and off soon after an overheating event.

The load 20, for example, may be a load in which a sharp starting current flows, such as during lighting operation of an incandescent lamp or starting of a motor during running operation. In a car, the load 20 may be a lamp having large power consumption (like a head lamp or a stop lamp) or a motor having large power consumption, such as a wiper motor or a power window motor. [Column 4, line 67 through column 5, line 6].

For example, a lamp of a car conforms to the characteristic shown in FIG. 23(A), and a motor of a car conforms to the characteristic shown in FIG. 23(C). [Column 21, lines 28-30].

Ohsaka's teaches that his load for a car is a lamp or a motor, which are not devices that utilize pre-cycle warm-up. Ohsaka does not teach or suggest that the load has a pre-cycle warm-up nor how or why to reduce pre-cycle warm-up for such components, as set forth in the claims of the present application. Ohsaka, like Izawa, is directed at preventing catastrophic part failure due to overheating or overcurrent. For similar reasons as with Izawa, one of skill in the art would not be motivated to combine Ma and Ohsaka, and a combination of Ma and Ohsaka would not result in the invention as claimed.

Further, Ma states in Column 1, lines 21-35 that "A difficulty currently encountered in complying with statutory regulations is that the temperature sensing elements available do not have the required proven durability and direct temperature measurement is not currently an available solution [to] this problem." The present application does not teach or suggest directly measuring the temperature of the vaporizer, catalytic converter, the catalyst, or the glow plug, as suggested by Ma, but rather utilizes the temperature of another electronic component, such as a driver. Thus, Ma teaches away from the solution provided by the present application, and teaches away from the temperature measurement approaches provided by Izawa and Ohsaka. Thus, one of skill in the art would not be motivated to combine these references based on such teachings.

Ma estimates the temperature of a non-electronic component, the hot operating system (referring either to a catalytic converter or fuel vaporizer), based on the time elapsed since the last time the engine was switched off. Given Ma's teachings, if the engine was last turned off a very long time ago and it was very cold outside

rendering the hot operating system cold by Ma's standards, but numerous unsuccessful attempts to turn the engine over (e.g., the engine did not start) took place over the last few minutes, Ma would allow the rapid heating system to turn on, even though the numerous unsuccessful attempts to turn the engine over have either warmed up the rapid heating system sufficiently or even overheated/damaged the rapid heating system, because Ma triggers his rapid heating system based on the last time the engine turned off. Thus, if the engine does not turn over, but his rapid heating system is engaged, the system taught by Ma is helpless to protect his rapid heating system. The present invention, however, will protect the components in the same situation because of the elements provided in the claims. Neither Izawa nor Ohsaka teaches or suggests how to modify Ma to overcome this and other shortcomings of Ma. Neither Izawa nor Ohsaka teach or suggest the problems of Ma that the present application has solved, neither teaches pre-cycle warm-up, and further both references try to solve a different problems than pre-cycle warm-up, hence one of skill in the art would not look to Izawa nor Ohsaka to handle pre-cycle warm-up in conjunction with Ma.

As the Examiner stated in the above-captioned office action, Izawa and Ohsaka prevent a driver from "burning out" due to overheating. The claims set forth herein do not protect the driver, but rather its load. Thus, combining Ma, Izawa, and/or Ohsaka fails to teach the invention as claimed.

4. Thus, no combination of Ma, Izawa, and/or Ohsaka teaches *determining when a key-on ignition condition for an internal combustion engine occurs* and when the temperature for the first electronic component exceeds a temperature condition, reducing pre-cycle warm-up for a second electronic component, as set forth in independent claim 1. Neither Ma, Izawa, nor Ohsaka teaches or suggests that *when the temperature for the first electronic component falls between a temperature condition when a second electronic component is warm and a temperature condition below which the second electronic component is damaged, reducing pre-cycle warm-up for the second electronic component*, as set forth in independent claim 13 and dependent claim 26. Further, no combination of Ma, Izawa, and/or Ohsaka teaches or suggests when the *temperature of the driver exceeds a temperature condition related to the electronic component*, reducing pre-cycle warm-up of the electronic component, as set forth in independent claim 15 as amended above.

Neither Ma, Izawa, nor Ohsaka teaches or suggests the various dependent claims of the present application. For example, neither Ma, Izawa, nor Ohsaka teaches reducing pre-cycle warm-up by *reducing pre-cycle warm-up time to a non-zero time* as set forth in claims 10 and 22. Neither Ma, Izawa, nor Ohsaka teaches or suggests reducing pre-cycle warm-up by *reducing pre-cycle warm-up current to a non-zero current* as set forth in claims 12 and 24. Neither Ma, Izawa, nor Ohsaka teaches or suggests that pre-cycle warm-up for a component is *reduced by a first amount at a first temperature condition* and pre-cycle warm-up for the component is *reduced by a second amount at a second temperature condition*, as set forth in claims 14 and 27. Neither Ma, Izawa, nor Ohsaka teaches or suggests reducing pre-cycle warm-up for at least a *third* electronic component, wherein *the first electronic component does not drive the third electronic component*, as set forth in claims 3 and 25. Neither Ma, Izawa, nor Ohsaka teaches or suggests *allowing the internal combustion engine to crank without waiting for pre-cycle warm-up* upon determining that the temperature of the first electronic component exceeds the temperature condition, as set forth in claim 4.

Furthermore, claims 2-12, 14, and 16-27 are dependent upon an independent claim that is shown to be allowable. For all these reasons, the dependent claims are themselves allowable.

5. Thus, the claims of the present invention are not taught or suggested by Ma, Izawa, and/or Ohsaka. Combining these references fails to teach or yield the invention as claimed. The combination of these references fails to teach or suggest all the elements of the claims. Further, one of skill in the art would not be motivated to make such a combination. Therefore, the present invention is not obvious in light of any combination of Ma, Izawa, and/or Ohsaka.

6. The Applicants amend claims 13 and 15 without prejudice or disclaimer. Amendment of claims 13 and 15 is not an admission that Ma in view of Izawa and/or Ohsaka renders the limitations obvious. Their amendment instead reflects the Applicants' desire to expeditiously proceed and prosecute the resulting claims in this application.

7. No new subject matter is introduced by the amendments to the above claims. The above change to claim 14 corrects a typographical error.

8. The Examiner is invited to contact the undersigned by telephone or facsimile if the Examiner believes that such a communication may advance the prosecution of the present application. Notice of allowance of claims 1-27 is hereby respectfully requested.

Respectfully submitted,

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By: Susan L. Lukasik

Susan L. Lukasik  
Registration No. 35,261  
Attorney for Applicant  
International Engine Intellectual Property  
Company, LLC  
Voice: (630) 753-2172  
Fax: (630) 753-3982